Test report

From

Motor Presse Stuttgart GmbH & Co KG
Leuschnerstraße 1 - 70174 Stuttgart

On behalf of:

Michelin

Mr. Romain Demant

Test of
Supersport-Tire Michelin Power RS vs. competitors
Oktober 2016 – Boxberg/Neuhausen Germany

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Shortcut: Motorrad TestCenter = MTC

A Preface

Client

➔ Michelin

Service provider

➔ Michelin

Selection of the test tires

Michelin

Tiresize

Front 120/70 ZR 17, Rear 190/55 ZR 17

Supersport Tires front/rear

➔ Bridgestone Battlax S21 Front, DOT 0916
➔ Bridgestone Battlax S21 Rear, DOT 1716

➔ Dunlop Sportmax Sportsmart II, DOT 1616
➔ Dunlop Sportmax Sportsmart II, DOT 0316

➔ Conti Sport Attack 3, DOT 1616
➔ Conti Sport Attack 3, DOT 1016

➔ Metzeler Sportec M 7 RR, DOT 3716, Specifikation "M"
➔ Metzeler Sportec M 7 RR, DOT 3516

➔ Michelin Pilot Power RS, DOT 4915
➔ Michelin Pilot Power RS, DOT 1516

➔ Pirelli Diablo Rosso III, DOT 4915
➔ Pirelli Diablo Rosso III, DOT 2916

Shortcut in the testreports:
Bridgestone
Dunlop
Conti
Metzeler
Michelin
Pirelli

Test bikes

➔ BMW S 1000 RR
➔

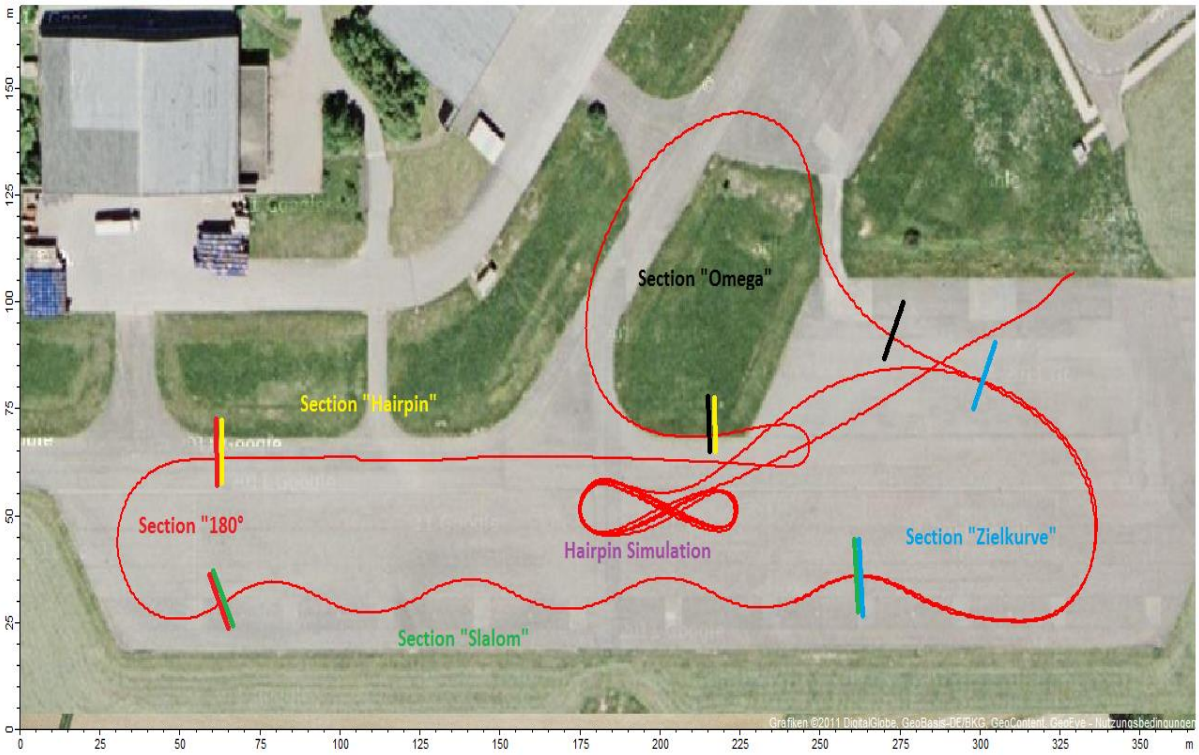
Responsible for Chassis-Settings

➔ MTC

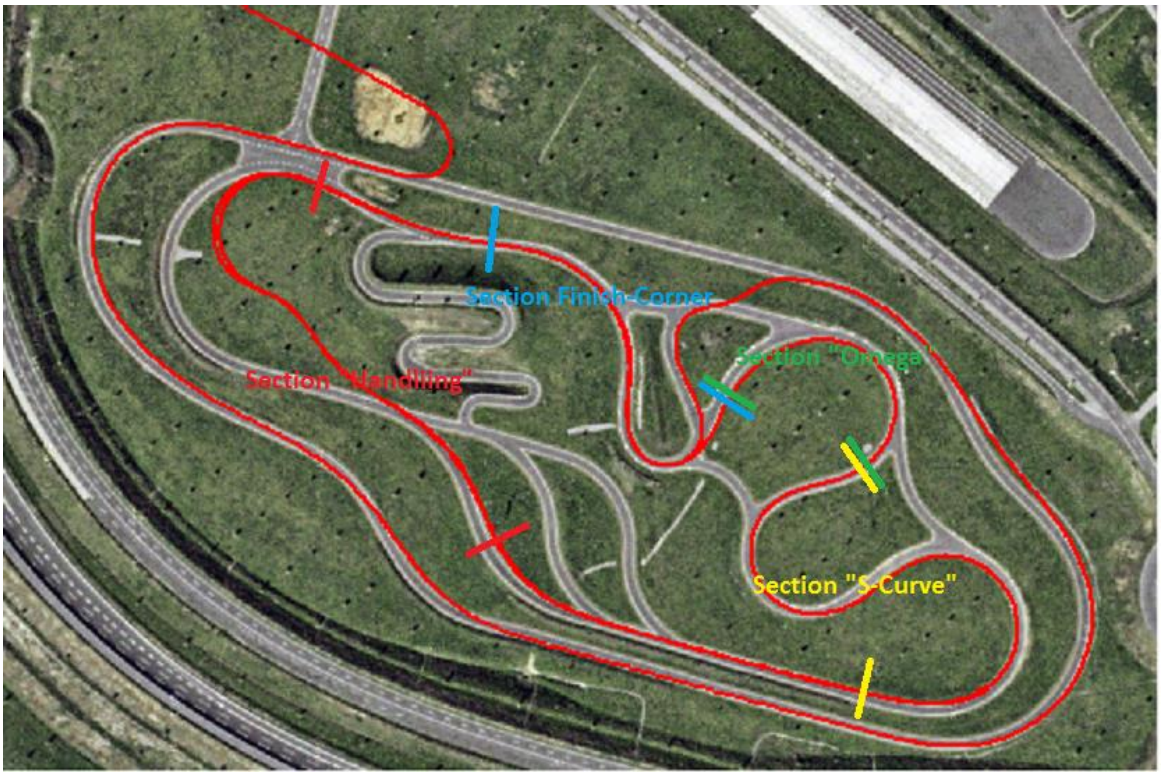
Selection Provinggground

➔ MTC

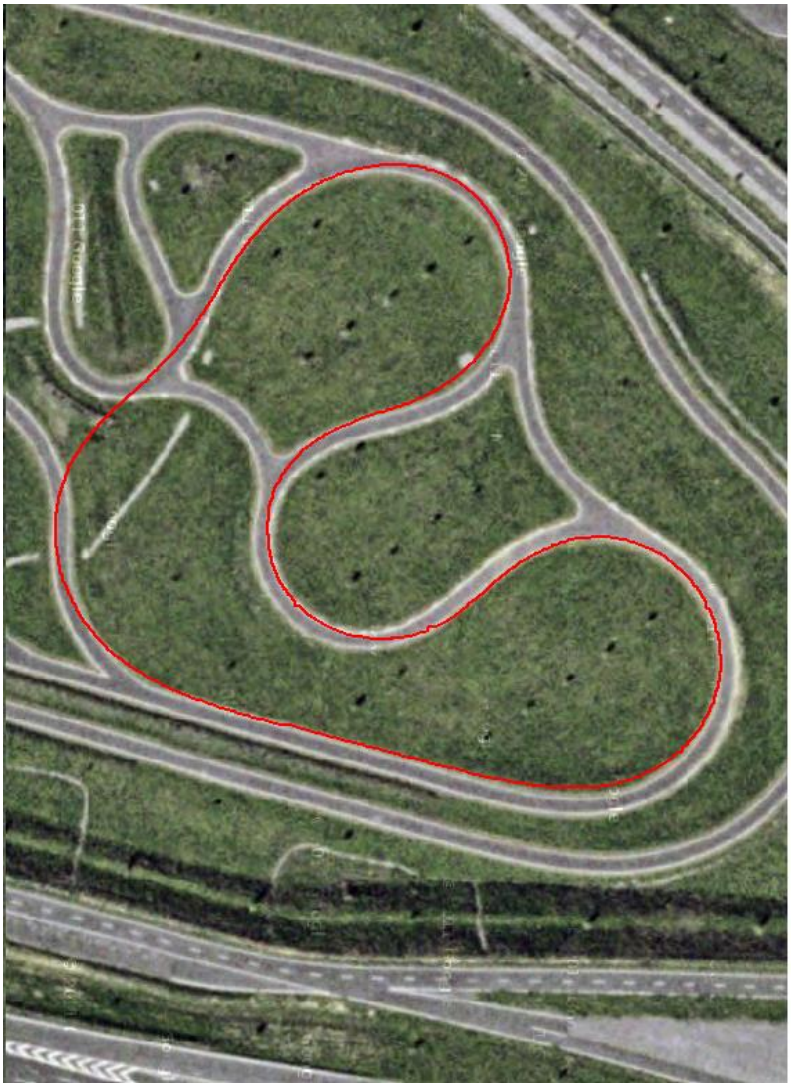
Neuhausen ob Eck/Germany MTC-Handlingcourse #3



Bosch Boxberg Handlingcourse HK1 and HK2



Bosch Boxberg Wet-Handlingcourse HK2



Tire Pressure

The air pressure in cold condition:

Front: 2,5 bar
Rear: 2,9 bar

A Preface

The MTC employees were in charge of the following:

2 MTC-test riders Stuttgart-Boxberg-Neuhausen-Stuttgart by car to transport tools and test equipment to Boxberg and Neuhausen proving ground

- Installation of the 2D-Datarecording units on the test bike
- Recording of all data and measured values
- Testing and evaluation the provided sets of test tires wet and dry handling
- Evaluation the 2D-Datarecording files
- Compose the test report

B.1 Test weighting

The point scoring system used by the Motorrad TestCenter allows for a maximum of 20 points for all criteria. This 20 point spread permits the testing of tires of different designs and for different use under uniform conditions.

B.2 Test drivers

The evaluation of the tire pairings was provided by one testrider in wet- and dry handling in Boxberg, and with two test drivers in Neuhausen/dry handling in road mode, using the methods and unique, specified criteria for testing and evaluation; see Item C.

Personal datas of the MTC-testrider

Thomas Ekhardt, body heigt: 170, weight ready to ride: 76 kg
Werner Koch, body height: 172, weight ready to ride: 96 kg

B.3 Weather conditions

The conditions for the whole test are nearly perfect and constant. The ground- and air-temperature was seasonal low (see point-scoring). These circumstance can have a influence of the test results.

B.4 Time Schedule

10. 10. 2016
Journey Stuttgart-Boxberg

11. 10. 2016
Boxberg-Stuttgart

12. 10. 2016
Stuttgart-Neuhausen

13. 10. 2016
Neuhausen-Stuttgart

14./15. 10. 2016
Composing the testreport and evaluation of the 2D datas.

19. 10. 2016
Sending the testreport to Michelin in english language

B.6 Test equipment

All test runs were recorded with the 2D-Datarecording unit.

These data were used to assist with the evaluation.

For the testruns, the following 2-D sensors were used on the BMW S 1000 RR

- ➔ Speed through GPS, antenna type: AC-GPSANT2-000
- ➔ Inclined position through GPS, see above

Other measuring instruments:

- ➔ Infrared thermometer Voltcraft 350
- ➔ Tirepressure Gauge RM/4-6A (www.flaig-praezision.de)

B.7 Test Tracks

The wet and dry-handling track of Boxberg in Neuhausen ob Eck was in perfect conditions all the test days.

B.8 Explanation 2D-Meausuring banking angle

The 2D data recording system calculates the inclined position from the speed and curve radius. At 45 degrees, this value, with the MTC designation "neutral inclined position", equates to a lateral G-force which increases the actual inclined position of the motorcycle by around 5 degrees when taking into account the center of gravity height and tire width. This results in a vehicle lean angle of around 50 degrees.

B.7-1 Vehicle identification / Bike #01

B.7.1. Test vehicle identification

Manufacturer:	BMW
Model designation:	S 1000 RR
Frame number:	WB10D1009FZ330702
Intern Code / Designation	Modell 2016
Registration number:	KA-BE 98
Engine number:	-
Gearbox number:	-
Others:	Riding Mode "Sport", TC "Sport"
Weight w. full tank and all fluids in kgs:	208 kg
Wheelbase in mm:	1432 mm
Steering head angle in degrees:	66,1°

B.7-1 Vehicle identification / Bike #01

B.7.2 Chassis components

Wheels and tyres / front wheel

Type:	Aluminium Cast
Rim dimension:	3,5" x 17"
Tyre dimension:	120/70ZR17

Wheels and tyres / Rear wheel

Type:	Aluminium Cast	
Rim dimension:	6,0" x 17"	
Tyre dimension:	190/55 ZR17	

Front forks				**Shock absorber**		
Manufacturer: Sachs				Manufacturer: Sachs		
Model and type: Std				Model and type: Std		
Electronic Adjustment				Electronic Adjustment		
Spring base	Visible 8 rings	Range		Spring base Solo Sport	Visible	Range
Return damping	Sport			Return damping	Sport	
Compression damping	Sport			Compression damping	Sport	

C Details of the MTC testing methods

C.1 Wet-mode

In the wet mode the driver is seated in upright position (Road-mode) and passed at the minimum three evaluated rounds on the limit of adhesion.

The MTC-test rider don't use weight transfer (Hanging-off) for the test with no-competition-tires, because they try to simulate the ride-stil of the customer in raining-conditions on public roads, not on the race track.

The section times therefore reflected the tire characteristic and grip level in wet condition (see B.9).

C.2 Dry-handling sport-mode

Cornering and dry handling were evaluated on the handling course in Boxberg.

The course in Boxberg was used to simulate the typical supersport riding situations. On these handling course, the rider maintains a sport-posture with hanging off/knee sliding in maximum banking angle.

C.3 Dry-handling road-mode

The course in Neuhausen where used to simulate the typical riding situations encountered on country roads. On the Neuhausen handling-course, the rider maintains a touring-posture without hanging off the motorcycle.

During this test, selected test criteria such as steering characteristics in hairpins, steering forces, neutrality in alternating curves and stability in bumpy corners are evaluated.

The weight-transfer by hangig-off ridestyle can influence the criterias like handling, cornering-stability and steering precision by more banking angle of the bike and more pressure/compression to the tires. So the MTC testriders use these posture to simulate the public-road conditions.

This test report was authored by Werner Koch of Motorrad TestCenter.

Stuttgart – 18. 10. 2016

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Werner Koch

	Pointscoring Dry-Handling/Sportmode							
Pos.	Boxberg, 10. 01. 2016	Max. Points	Bridgestone S21	Conti Sport Attack 3	Dunlop Sportsmart2	Metzeler M 7 RR	Michelin Power RS	Pirelli Diablo Rosso III
A								
A 1	Stablity in Corners	20	18	17	16	17	18	17
A 2	Steering Precision	20	17	16	16	16	19	17
A 3	Steeringforce in inclined Position	20	17	18	17	16	18	17
A 4	Steering Precision corner exit/running wi	20	17	16	15	17	18	17
A 5	Stability under acceleration	20	16	16	16	17	18	16
A 6	Handling in alternating corners	20	17	18	15	16	20	17
A 7	Sidegrip	20	17	18	17	17	18	18
A 8	Sidegrip behavior	20	17	17	16	16	17	17
A 9	Sidegrip under acceleration	20	17	16	16	16	17	17
A 10	Feedback in Corners	20	16	17	16	16	17	16
A 11	Uprightmoment in corners with brake	20	17	17	16	15	18	17
A 12	Uprightmoment entering corners with bra	20	17	17	15	15	18	16
	Summery Dry-Handling Testmode	240	203	203	191	194	216	202
	Ranking and %		2. 94,0%	2. 94,0%	6. 88,4%	5. 89,8%	1. 100%	4. 93,5 %
B	Measurement and Sectiontimes							
	Best laptime (1279 m)		0.59,9 min	1.00,4 min	1.01,8 min	0.59,9 min	0.59,1 min	1.00,1 min
	Section "Handling" (330 m)		15,4 s	15,2 s	15,9 s	15,1 s	14,7 s	15,1 s
	Section "S-Curve" (220 m)		16,9 s	17,2 s	17,6 s	17,1 s	16,9 s	17,2 s
	Section "Omega" (165 m)		8,5 s	8,6 s	8,7 s	8,5 s	8,6 s	8,6 s
	Section "Finish-Corner" (215 m)		11,5 s	11,4 s	11,7 s	11,5 s	11,1 s	11,3 s
	Tirepressure could 2.5/2,9 bar							
	Tiretemperature arround Front: 32° to 35° degrees							
	Tiretemperature arround Rear: 38° to 48° degrees							
	Groundtemperature arround 8° to 10° degrees							
	Airtemperature arround 5° to 13° degrees							

	Pointscoring Dry-Handling/Roadmode							
Pos.	Neuhausen, 12. 10. 2016	Max. Points	Bridgestone S21	Conti Sport Attack 3	Dunlop Sportsmart2	Metzeler M 7 RR	Michelin Power RS	Pirelli Diablo Rosso III
A								
A 1	Stablity in corners	20	18	17	16	17	18	17
	Stability in bumpy corners with compressior	20	18	18	18	14	18	15
A 2	Steering Precision in slalom section	20	17	17	16	16	19	17
A 3	Steeringforce in inclined position	20	17	18	17	17	19	17
A 4	Steering precision corner exit/running wide	20	17	18	16	16	19	17
A 5	Stability under acceleration	20	18	18	17	16	18	16
A 6	Handling in alternating corners	20	17	18	16	16	19	17
A 10	Feedback in corners	20	16	17	16	16	17	16
A 11	Uprightmoment in corners with brake	20	17	17	16	15	18	17
A 12	Uprightmoment entering corners with brake	20	17	17	15	15	18	16
	Summery Dry-Handling Roadmode	200	172	175	163	158	183	165
	Ranking and %		3. 93,9%	2. 95,6%	5. 89,0 %	6. 86,0%	1. 100%	4. 90,2%
B	Measurement and Sectiontimes							
	Best lap		55,8 s	55,0 s	56,2 s	56,4 s	54,1 s	55,7 s
	Section "Omega" 230 m		14,3 s	14,2 s	14,5 s	14,7 s	14,3 s	14,5 s
	Section "Hairpin" 470 m		13,3 s	12,9 s	13,3 s	13,1 s	13,0 s	13,2 s
	Section "180°" 550 m		6,6 s	6,5 s	6,6 s	6,4 s	6,2 s	6,5 s
	Section "Slalom" 740 m		12,4 s	12,4 s	12,6 s	12,6 s	11,9 s	12,4 s
	Section "Zielkurve" 880 m		9,0 s	8,9 s	9,0 s	9,0 s	8,5 s	8,9 s
	km/h in the section "Slalom" 190 m meas. length		54,7 km/h	54,8 km/h	54,4 km/h	54,4 km/h	57,4 km/h	55,2 km/h
	Tirepressure could 2.5/2,9 bar							
	Tiretemperataure arround Front: 32° to 36° degrees							
	Tiretemperature arround Rear: 38° to 42° degrees							
	Groundtemperature arround 4° to 14° degrees							
	Airtemperature arround 8° to 15° degrees							

Pos.	Pointscoring Wet-Handling	Max Points						
	Boxberg, 10. 10. 2016		Bridgestone S21	Conti Sport Attack 3	Dunlop Sportsmart2	Metzeler M 7 RR	Michelin Power RS	Pirelli Diablo Rosso III
D	**Wethandling**							
D 1	**Stability in corners**	**20**	18	16	16	19	17	18
D 2	**Steering precision entering corners**	**20**	18	16	16	18	17	18
D 3	**Steeringforce in inclined position**	**20**	17	17	16	18	17	17
D 4	**Steering precision on corners exit/running wide**	**20**	17	15	15	17	16	16
D 5	**Stability under acceleration**	**20**	17	16	16	17	16	17
D 6	**Handling in alternating corners**	**20**	18	15	16	18	17	18
D 7	**Grip front**	**20**	18	17	17	20	18	19
D 8	**Grip rear**	**20**	17	16	16	19	15	19
D 9	**Gripbalance**	**20**	18	16	16	19	17	18
D 10	**Sidegrip behavior**	**20**	18	16	16	19	17	17
D 11	**Traction acceleration**	**20**	18	15	15	19	15	18
D 13	**Feedback**	**20**	18	17	16	18	17	18
	Sum total	**240**	**212**	**192**	**191**	**221**	**199**	**213**
	Ranking and %		**3. 95,0%**	**5. 86,9%**	**6. 86,4%**	**1. 100%**	**4. 90,0%**	**2. 96,3 %**
	Best Laptime		**43,5 s**	**45,4 s,**	**45,5 s**	**42,5 s**	**45,6 s**	**42,5 s**
	Sectiontime S-Curves (360 m)		22,0 s	22,9 s	23,0 s	21,3 s	23,1 s	21,3 s
	Sectiontime Omega (170 m)		10.6 s	11,2 s	11,2 s	10, 4 s	11,2 s	10,4 s
	Sectiontime Finish Corner (185 m)		10,3 s	10,5 s	10,6 s	9,9 s	10,6 s	9,9 s
	Omega average speed*		56,2 km/h	53,4 km/h	52,96 km/h	56,1 km/h	53,4 km/h	56,9 km/h
	Omega average banking degrees*		33,8°	30,9°	30,4°	34,1°	30,5°	33,9°
	Tiretemperature arround Front: 22° to 25° degrees							
	Tiretemperature arround Rear: 25° to 27° degrees							
	Ground/Watertemperature arround 10° to 12° degrees							
	Airtemperature arround 8° to 15° degrees							
	*100 meter measured length							

Test report

From

MotorradTestCenter

Motor Presse Stuttgart GmbH & Co KG
Leuschnerstraße 1 - 70174 Stuttgart

On behalf of:

Michelin
Mr. Romain Demant

Test of
Supersport-Tire Michelin Power RS vs. competitors
Oktober 2016 – Boxberg/Neuhausen Germany

Selection of the test tires

- ➔ Bridgestone Battlax S 21
- ➔ Dunlop Sportsmart II
- ➔ Conti Sport Attack 3
- ➔ Metzeler Sportec M 7 RR
- ➔ Michelin Pilot Power RS
- ➔ Pirelli Diablo Rosso III

Test bikes

- ➔ BMW S 1000 RR

Provingground

- ➔ Bosch Boxberg/MTC Handling-Track #3 Neuhausen ob Eck

Tire Pressure

The air pressure, measures in cold condition:

Front: 2,5 bar
Rear: 2,9 bar

Evaluation of test tires

Bridgestone

Bridgestone

Dry-Handlling Boxberg Place 2./94,0 %
Dry-Handling Neuhausen Place 3./93,9 %
Wet-Handling Boxberg Place 3./95,0%

Dry handling

The Bridgestone tires shine with their very good handling and cornering stability characteristics, even in extreme inclined positions. With its low uprighting moment, the BMW S 1000 RR test motorcycle also stays steady in an inclined position and when turning into bends, holding the defined line well in the process. In all riding situations, the Bridgestone tires behave very neutrally and unobtrusively in the best sense. The Bridgestone S 21 also maintains these positive characteristics in the serpentine bend combinations of the MTC handling course in Neuhausen.

Wet handling

With a forgiving limit range, assured grip balance and precise steering, the Bridgestone performs outstandingly on the wet test course.

Continental

Dry-Handlling Boxberg Place 2./94,0 %
Dry-Handling Neuhausen Place 2./95,6 %
Wet-Handling Boxberg Place 5./86,9%

Dry handling

Good handling, low steering force in an inclined position and solid cornering stability all serve to emphasize the sporty character of the Continental tire. Only in a fully inclined position at the exit of the bend does it tend to understeer slightly and drift outward. The low uprighting moment when braking in an inclined position and the flawless cornering stability in serpentine bends all round off the positive profile.

Wet handling

The Continental feels slippery and slightly unstable in all situations and pushes outward at the exit of the bend, thereby causing the otherwise very good handling of the Continental to suffer.

Dunlop

Dry-Handlling Boxberg Place 6./88,4%
Dry-Handling Neuhausen Place 5./89,0%
Wet-Handling Boxberg Place 6./86,4%

Dry handling

The Dunlop tire is somewhat rigid going into alternating bends on the BMW S 1000 RR and demands powerful steering actions to hold the desired line, particularly when exiting bends. In addition, it can be a little stubborn to steer when braking. However, the BMW remains stable and unswerving in an inclined position – even on bumpy road surfaces.

Wet handling

On the wet test course, the Dunlop handles stubbornly and runs considerably wide at the exit of the bend. The grip level also isn't up to the standard of its best competitors.

Metzeler

Dry-Handlling Boxberg Place 5./89,8 %
Dry-Handling Neuhausen Place 6./86,0 %
Wet-Handling Boxberg Place 1./100%

Dry handling

The BMW completes the handling course in Boxberg with good handling and steering precision when equipped with the Metzeler tires. However, the high uprighting moment when braking in an inclined position is troublesome. In serpentine curves, the Metzeler tire is not as stable as its competitors and tends to understeer when driving over bumps in the road and into bends with compression.

Wet handling

The best adhesion, best cornering stability and best handling in wet conditions: On the wet handling course, the Metzeler tires even set the benchmark for the Pirelli tire from the same manufacturer

Michelin

Dry-Handlling Boxberg Place 1./100%
Dry-Handling Neuhausen Place 1./100%
Wet-Handling Boxberg Place 4./90,0%

Dry handling

The Michelin tire pair impresses in all aspects of dry handling. Extremely light handling, brilliant steering precision in all types of bends and impeccable cornering stability all make the Michelin a winner – and not just in terms of points scored. With these tires, the handling of the BMW is exquisite. The thoroughly positive overall profile is rounded off by the lowest uprighting moment when braking in an inclined position and the best stability in serpentine curves, even during the country road simulation.

Wet handling

The Michelin lacks a little rear wheel grip on the wet handling course, which means it is unable to match the strong section times or lap times of the Metzeler or Pirelli. On the other hand, the handling and grip balance are flawless.

Pirelli

Dry-Handlling Boxberg Place 4./93,5%
Dry-Handling Neuhausen Place 4./90,2%
Wet-Handling Boxberg Place 2./96,3%

Dry handling

Slightly superior to the Metzeler tire from the same manufacturer in terms of handling, the Pirelli leaves nothing to be desired on the handling course in Boxberg. Only when driving over bumps in the road in an extreme inclined position does it suffer from similar problems as the Metzeler. In addition, the front wheel feels a little wooden when driving over edging and separation gaps.

Wet handling

Like the Metzeler, the Pirelli steals the show on the wet handling course thanks to its impressive adhesion, cornering stability and solid grip. It is only the slightly wooden feel of the front tire that disrupts the good ride comfort.

Conclusion

In the dry handling test, the Michelin Power RS comes out considerably above the current high-caliber competition. The truly outstanding characteristic is the precise, extra-light steering in combination with brilliant handling and fantastic cornering stability. In terms of safety, the front tire of the Michelin Power RS sets the standard. The BMW S 1000 RR steers and maneuvers effortlessly when braking. This allows the motorcycle to be brought into an inclined position with low steering force, for example when the driver brakes late or drives into tightening curves.
Sporty motorcycles benefit from the handling of the Michelin RS, which facilitates quick changes of lean angle and nimble turns with very little steering force while also enhancing the super-sporty character of the BMW S 1000 RR. The BMW doesn't stray from its path when accelerating out of bends, allowing the driver to hold a perfect driving line. However, the refined handling of the Michelin Power RS doesn't revert to wobbling or even instability in slow curves, meaning that even hairpin bends can be rounded effortlessly with very low steering force required – all the while maintaining the tightest line with flawless stability. On a dry test track, the Michelin covers a broad range of application with impeccable all-round characteristics.

In the wet test, however, the Michelin RS can only manage a spot in the upper-mid-range. Although the handling characteristics guarantee an assured grip balance with excellent handling in wet conditions thanks to the good adhesion of the front tire, the traction and lateral adhesion of the rear wheel just can't match the best tire from the competition.

This test report was authored by Werner Koch.

Persons present during testing:

Michelin

- ➔ Mr. Thomas Ochsenreither

Motorrad TestCenter

- ➔ Mr. Werner Koch
- ➔ Mr. Thomas Ekhardt

Stuttgart – 18. 10. 2016

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Werner Koch
Technical Manager/Road Testing